

ABSTRACT OF THE DISCLOSURE

The invention is to prevent an interlayer cleavage between a phosphor layer and a moisture-preventing protective layer.

5 In a radiation converting substrate constituted by forming at least a phosphor layer 12 composed of an alkali halide for converting a radiation into light and a light emission activator, and a moisture-preventing protective layer in succession on a
10 radiation-transmitting substrate 11, the moisture-preventing protective layer is constituted of a first plasma polymerization film 13 formed from a monomer of a silane compound, and a second plasma
15 polymerization film 14 formed from a monomer of a fluorine-containing unsaturated hydrocarbon. A radiation image pickup apparatus is formed by adhering such radiation converting substrate and a sensor substrate having a photoelectric converting element.